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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/470,265	12/22/1999	KARL M ROBINSON	303.455US3	5953

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EXAMINER

TRAN, THIEN F

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/470,265

Applicant(s)

ROBINSON, KARL M

Examiner

Thien Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19,20,53,79-87,98-102 and 104-124 is/are pending in the application.
- 4a) Of the above claim(s) 80,83,86,98-102,104-106 and 113-124 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19,20,53,79,81,82,84,85,87 and 107-112 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 23.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Objections***

Claim 108 is objected to because of the following informalities: lines 2-3, "the first conductive plate" should be --the first conductive capacitor plate--.

Appropriate correction is required.

Claim 110 is objected to because of the following informalities: lines 2-3, "the first conductive plate" should be --the first conductive capacitor plate--.

Appropriate correction is required.

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed, a device.

The following title is suggested: Devices having improved capacitance.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 19, 53, 79, 81, 85, 87, 108 and 112 are rejected under 35

U.S.C. 102(b) as being anticipated by Suguro et al. (USPN 5,189,503).

Suguro et al. discloses the claimed capacitor (Fig. 7d) comprising a first conductive capacitor plate 45 of W; a second conductive capacitor plate 51; a dielectric 47 interposed between said first and second conductive capacitor

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plates, wherein said dielectric is a metal oxide of  $WO_2$  overlying the first conductive capacitor plate, wherein a metal layer includes a non-oxidized portion 45 and an oxidized portion 47, wherein the oxidized portion is the dielectric.

Regarding claims 79 and 85, the oxidized portion 47 of the metal layer comprises tungsten.

Regarding claims 81 and 87, the second conductive capacitor plate 51 is formed of metal.

Regarding claims 108 and 112, the capacitor further comprises a diffusion barrier layer (an upper portion of the layer 45 of tungsten) interposed between the first conductive capacitor plate (a lower portion of the layer 45 of tungsten) and the oxidized portion 47 of the metal layer.

Claims 19, 53, 79, 81, 85, 87, 107, 108, 111 and 112 are rejected under 35 U.S.C. 102(b) as being anticipated by Hirose (JP 7-226485).

Hirose discloses the claimed capacitor (Fig. 13) comprising a first conductive capacitor plate 13 of Ti; a second conductive capacitor plate 17; a dielectric 14A interposed between said first and second conductive capacitor plates, wherein said dielectric is an metal oxide layer of  $TiO_2$  overlying the first conductive capacitor plate, wherein a metal layer of Ti includes a non-oxidized portion 13 and an oxidized portion, wherein the oxidized portion is the dielectric.

Regarding claims 79, 85, 107 and 111, the oxidized portion 14A of the metal layer comprises titanium.

Regarding claims 81 and 87, the second conductive capacitor plate 17 is formed of metal.

Regarding claims 108 and 112, the capacitor further comprises a diffusion barrier layer 14 interposed between the first conductive capacitor plate 13 and the oxidized portion 14A of the metal layer.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20, 82, 84 and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blodgett et al. (USPN 5,811,990) in view of Suguro et al. (USPN 5,189,503).

Blodgett et al. discloses a memory system 710 (Fig. 18) comprising a monolithic memory device 705 having dynamic random access memory device containing a capacitor; and a processor 710 used to generate external control signals which access the monolithic memory device 705 (col. 14, lines 10-15). Blodgett et al. does not explicitly disclose the capacitor comprising a first conductive capacitor plate, a second conductive capacitor plate, a metal oxide layer and a metal layer overlying the first conductive capacitor plate. Suguro et al. as described in details above discloses the capacitor as claimed. It would have been obvious to person having ordinary skill in the art at the time the invention was made to substitute the capacitor as taught by Suguro et al. for the capacitor in the memory system of Blodgett et al. in order to provide an improved

capacitor with low current leakage. As a result, the modified Blodgett et al. provides a capacitor comprising a first conductive capacitor plate formed of a first material; a second conductive capacitor plate; a metal oxide layer and a metal layer interposed between said first and second conductive capacitor plates.

Regarding claim 82, the oxidized portion of the metal layer comprises tungsten.

Regarding claim 84, the second conductive capacitor plate is formed of metal.

Regarding claim 110, the capacitor further comprises a diffusion barrier layer (an upper portion of layer 45 of tungsten) interposed between the first conductive capacitor plate (a lower portion of layer 45 of tungsten) and the oxidized portion 47 of the metal layer.

Claims 20, 82, 84, 109 and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blodgett et al. (USPN 5,811,990) in view of Hirose (JP 7-226485).

Blodgett et al. discloses a memory system 710 (Fig. 18) comprising a monolithic memory device 705 having dynamic random access memory device containing a capacitor; and a processor 710 used to generate external control signals which access the monolithic memory device 705 (col. 14, lines 10-15). Blodgett et al. does not explicitly disclose the capacitor comprising a first conductive capacitor plate, a second conductive capacitor plate, a metal oxide layer and a metal layer overlying the first conductive capacitor plate. Hirose as described in details above discloses the capacitor as claimed. It would have

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been obvious to person having ordinary skill in the art at the time the invention was made to substitute the capacitor as taught by Hirose for the capacitor in the memory system of Blodgett et al. in order to provide an improved capacitor with large capacity. As a result, the modified Blodgett et al. provides a capacitor comprising a first conductive capacitor plate formed of a first material; a second conductive capacitor plate; a metal oxide layer and a metal layer interposed between said first and second conductive capacitor plates.

Regarding claims 82 and 109, the metal oxide layer 14A comprises titanium.

Regarding claim 84, the second conductive capacitor plate is formed of metal.

Regarding claim 110, the capacitor further comprises a diffusion barrier layer 14 interposed between the first conductive capacitor plate 13 and the metal oxide layer 14A.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tt  
August 28, 2003



Thien Tran  
Patent Examiner  
Technology Center 2800